

IN THE CLAIMS

1. (Currently Amended) A method of sequencing a polymer comprising:
 - a) dividing a polymer sample into a number of polymer subsamples, wherein there is ~~at least one~~ a polymer subsample created for each type of monomer present in the polymer sample, wherein only one of the monomer types in each polymer subsample is labeled, and wherein both labeled and unlabeled instances of the one monomer type are ~~randomly~~ incorporated in the polymer subsample;
 - b) sequentially separating each monomer from the polymer subsample;
 - c) detecting the labels of each separated labeled monomer as a function of time;
 - d) constructing a time map for each monomer type in each polymer subsample; and
 - e) assembling the time maps into a polymer sequence.
2. (Original) The method of claim 1 wherein the polymer is a nucleic acid, the monomer is a nucleotide, and the number of polymer subsamples and different monomer types is four.
3. (Original) The method of claim 2, wherein each subsample comprises from about 1000 to about 100,000 copies of the nucleic acid.
4. (Original) The method of claim 2, wherein the labels are bulky groups.
5. (Canceled)
6. (Currently Amended) The method of claim 2, further comprising attaching the ~~labeled nucleic acid~~ polymer subsample to a surface.
7. (Canceled)

8. (Amended) The method of claim 7 1 wherein the polymer is a nucleic acid and sequentially separating each monomer from the polymer subsample is done by an enzyme that has exonuclease activity.
9. (Original) The method of claim 1 wherein detecting the time between labels is accomplished/measured with a time-gated detection device.
10. (Amended) The method of claim 9, wherein the detection device is an optical device, ~~a nanopore device, or an electrical device.~~
11. (Original) The method of claim 1, wherein constructing monomer time maps of each of the polymer subsamples comprises analyzing the measured time by overlapping data analysis and frequency analysis to construct the time maps.
12. (Original) The method of claim 1, wherein assembling monomer time maps into a polymer sequence comprises minimum non-overlapping data analysis.
13. (Currently Amended) A method of sequencing a polymer comprising:
- a) dividing a polymer sample into a number of polymer subsamples ~~equal to a number of different monomer types comprising the polymer sample~~ wherein there is a polymer subsample created for each type of monomer present in the polymer sample, wherein only one of the monomer types in each polymer subsample is partially labeled such that ~~an average time between two adjacent labeled monomers is significantly larger than an average time between two adjacent monomers of the same type in the polymer subsample before labeling~~ and wherein both labeled and unlabeled instances of the one monomer type are incorporated in the polymer subsample;
 - b) moving ~~the an~~ an intact partially labeled polymer from a polymer subsample comprising labeled and unlabeled monomers across a detector;
 - c) measuring a time between the partially labeled monomers;

d) constructing a time map for each detected labeled monomer for ~~each~~
~~partially labeled~~ the polymer strand comprising labeled and unlabeled monomers;
and

c) repeating steps b) through d); and

e)-f) assembling the time maps into a sequence for the polymer.

14. (Original) The method of claim 13 wherein the polymer is a nucleic acid, the monomer is a nucleotide, and the number of polymer subsamples and different monomer types is four.

15. (Original) The method of claim 14, wherein each subsample comprises from about 1000 to about 100,000 copies of the nucleic acid.

16. (Original) The method of claim 14, wherein the labels are bulky groups.

17. (Canceled)

18. (Currently Amended) The method of claim 14, further comprising attaching ~~the labeled nucleic acid~~ a polymer comprising labeled and unlabeled monomers to a surface.

19. (Original) The method of claim 13 wherein detecting the time between labels is accomplished/measured with a time-gated detection device.

20. (Amended) The method of claim 19, wherein the detection device is an optical device, ~~a nanopore device, or an electrical device.~~

21. (Amended) The method of claim 20, wherein the detector is ~~selected from the group consisting of an ion channel lipid bilayer sensor, a photodetector, an electrical detector and a mass detector.~~

22. (Original) The method of claim 13, wherein constructing monomer time maps of each of the polymer subsamples comprises analyzing the measured time by overlapping data analysis and frequency analysis to construct the time maps.
23. (Original) The method of claim 13, wherein assembling monomer time maps into a polymer sequence comprises minimum non-overlapping data analysis.
24. (Currently Amended) The method of claim 14, wherein at least one end of each nucleic acid ~~strand~~ is attached to a distinguishable label.
25. - 29. (Canceled)